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THE HOME VEGETABLE GARDEN

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THE HOME VEGETABLE GARDEN

H. A. JONES[1]

The primary object of a home garden is to produce an adequate supply of fresh vegetables for the owner's table. In most localities in California it is possible to have fresh vegetables from the home garden during most of the year. Few people realize the large number of different crops that can be grown here successfully. Whether on a farm, in the rural village, or in the city, the home garden may be made a place of pleasure as well as profit. A small plot of ground can be made to supply a large quantity of vegetables. It is also true that more vegetables are consumed when they are produced in the home garden than when they are purchased. This results in the substitution of vegetables for more costly articles of food.

In recent years the importance of vegetables in the diet to supply vitamines, mineral salts, and cellulose is being stressed more and more. The quality and flavor of fresh products harvested from the garden and served within a short time are often much superior to those of vegetables that are purchased at the retailer's. The home garden often serves as a center of interest for the children; besides occupying their time, it can be made a good source of revenue. The pleasure of making plants grow, and the satisfaction of converting a piece of bare or neglected soil into an attractive garden plot, should also be considered.

SELECTING THE LOCATION

If there is a choice of location, it is best to select a sandy loam soil; this type is suitable for most vegetables; it irrigates and drains well and is easy to keep in good physical condition. A heavy soil, however, can be improved considerably by applying rather coarse manure or some other type of organic matter. Heavy soil is benefited by applying a load or two of sand; of course, this method is rather costly if the area to be treated is very large. Light, sandy soils may be infertile and tend to dry out. The water-holding capacity of this type

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of soil can be increased somewhat by working into it considerable amounts of well-rotted organic matter. Its productivity can be improved by applying manures or commercial fertilizer.

The garden should be near the home, to lessen the labor in going to and from it, and to enable the owner to keep it under close observation. On the farm especially, there is danger of locating the garden too far from the home.

Fig. 1.—Fall vegetable gardens grown by students at the University Farm, Davis. Almost all varieties of vegetables were planted the third week of August, and almost all were harvested before the middle of December. The varieties and crops grown were Snowball cauliflower, Copenhagen Market cabbage, Southern Curled mustard, Scotch Curled kale, Paris White Cos lettuce, New York lettuce, Chantenay carrots, Detroit Dark Red beets, Paoting Chinese cabbage, Purple Vienna kohlrabi, Large White rutabaga, Purple Top White Globe turnip, Savoy spinach, Prickly Winter spinach, green bunch onions from dry sets, and Bountiful beans.

The garden should be located near a faucet or an irrigation line in order to insure an adequate supply of water. Most vegetables need considerable moisture to keep them growing and to make them good edible quality.

It is also best to have the garden protected from the prevailing winds, especially if these are drying and severe. Proximity to large trees should be avoided, as most crops need full sunlight, and as the trees use the plant food and soil moisture for a considerable distance on all sides. Some crops, however, such as spinach and lettuce, do fairly well growing in partial shade, especially during the warm season.

PLANNING THE GARDEN

No one garden plan will suit all conditions or all tastes. It is best, however, to make one plan and then follow it throughout the season. A list of varieties can be found in table 1 at the back of this circular, and planting dates in table 2.

In planning the garden, the following points should be kept in mind.

(1) The vegetables planted should be those most desired by the family.

(2) A small garden well cared for is better than a large one, neglected. Regardless of size, it should be planned to be economical of labor. In the small gardens, much time and labor can be saved by use of the wheel hoe. If there is plenty of space available it is best to plant the rows sufficiently far apart for horse cultivation.

(3) The rows should be run in the direction that will give the best irrigation and drainage. Other conditions being equal, it is usually best to have rows run north and south for the effects of shading are then less marked.

(4) Perennials, such as rhubarb, asparagus, globe artichoke, berries, and other crops that remain in one place for several years, should be located on one side of the garden so that they will not interfere with plowing.

(5) Parsnips, salsify, and other long season crops should be grouped together. All crops that occupy the land during about the same period of time should be planted side by side.

(6) In most parts of California "succession cropping" can be carried on very successfully. Corn, tomato, eggplant, pepper, and other warm season crops can be used to follow winter or early spring crops, like lettuce, peas, carrots, and beets. Where the available land is limited, the entire garden should be made to produce throughout the growing season. There is less danger of portions of the garden growing weeds if it is cropped continually.

(7) Companion cropping is the growing of two or more crops on the same area at one time. Under certain conditions, quick-maturing crops like spinach, lettuce, radishes, etc., may be planted between rows of eggplant and other crops that are spaced far apart. The former are usually harvested before the latter have made much growth. Companion cropping is seldom used except where the available land is very limited.

PREPARATION OF THE SOIL

In the higher altitudes and where there is a large winter rainfall, the heavier types of soil should be plowed in the fall, to improve the physical condition and to make possible early spring planting. A heavy soil plowed or spaded too wet will bake when drying, and it will be difficult to get a fine, well-pulverized seed bed. If soil retains its form after pressing in the hand it is usually too wet to plow. Deep plowing is advantageous because it facilitates aeration, irrigation and drainage, and root growth. On light soils the time of plowing is not so important, for there is less danger of getting them into a poor physical condition. After plowing, the soil should be harrowed or raked to make the surface soil fine. As a rule, the best time to harrow is shortly after plowing, before the freshly upturned soil has had a chance to bake. The most successful gardeners always have the soil in a well pulverized condition before starting planting operations.

MANURE AND COMMERCIAL FERTILIZERS

Probably the best means of soil improvement for the home garden is to apply barnyard manure, for it supplies the elements necessary for plant growth, as well as organic matter to the soil. As a rule the addition of 20 to 30 tons of manure to the acre is sufficient. The manure should be applied somewhat in advance of the planting season, and plowed under to give it an opportunity to decay and become incorporated in the soil. Manure, however, especially in the cities, is becoming more difficult to obtain and it may therefore be necessary to apply commercial fertilizers to get the best plant growth.

On a small home garden planted intensively it is probably best to apply a complete fertilizer at the rate of about 1500 pounds per acre. A good general-purpose fertilizer of this kind should analyze about eight per cent ammonia, six per cent phosphoric acid, and six per cent potash. On very light sandy and muck soils the potash might be increased to eight or ten per cent. In muck and peat soils, plenty of available nitrogen is usually already present. The complete fertilizer should be broadcast after plowing and then thoroughly mixed with the soil by use of the disk or harrow before seeds are sown or plants are set. The constituent most generally lacking in the mineral soils of California is nitrogen. For this reason it may be profitable to give top dressings of nitrate of soda or sulfate of ammonia to

certain crops after they are well established. These latter fertilizers will stimulate vegetative growth above ground and are often applied at the rate of 200 pounds per acre to foliage crops like lettuce, spinach, cabbage, kale, endive, chard, and parsley. There is danger of burning the leaves if these fertilizers come into contact with them. It is also safest to apply these fertilizers when the foliage is dry. If used during the dry season the surface applications of fertilizer should be cultivated into the soil and then given an irrigation.

On many soils application of commercial fertilizer is unnecessary. It should be used only when the proper growth is not obtained. It is wasteful to add fertilizer when it is not needed.

IRRIGATION

Under California conditions furrow irrigation is probably better for most crops than overhead irrigation. Under the former system the foliage can be kept dry, so that many of the foliage diseases will be held in check. More frequent irrigations will be necessary in the interior valleys, where the temperature is high, than along the coast. Sandy soils require more frequent irrigation than heavy soils. Irrigation should be thorough but not too frequent. The tendency is to give too much water rather than too little.

In some sections of California a good winter garden can be grown without irrigation. The seeds are sown after the beginning of the fall rains and cool season crops with a short growing period can be brought to maturity without irrigation. If irrigation is necessary in the spring to bring the crop to maturity, shallow furrows can be made between the rows to carry the water. As a rule, however, it is best to plant certain crops on raised beds, especially if surface irrigation is necessary. In figure 1 is shown a type of bed that is often used for the growing of beets, spinach, kale, kohlrabi, turnips, rutabagas, Chinese cabbage, radishes, peas, string beans, carrots, celery, parsley, lettuce, salsify, endive, etc. The beds may vary from 18 to 20 inches or more in width and the furrows from 18 to 22 inches or more. The beds should not be less than three feet from center to center. The rough beds can be made with a lister or with a moldboard plow; if the area is very small a shovel or hoe can be used. They can be formed and smoothed with a sled or rake, according to the size of the garden. The seed is drilled in rows near the edges of the bed. After seeding, water is run in the furrows, but it should not be allowed to flood the bed, for flooding causes the soil to bake on top

of the bed, so that the seedlings are not able to come through except on the lighter types of soil. In the interior valleys, during the summer, irrigation will probably be necessary every week or two, except, probably, in the case of tomatoes. Along the coast less frequent irrigations are the rule.

Similar beds may be made for cabbage, cauliflower, Brussels sprouts and sweet potatoes. Sweet potato plants are set on top of the bed, whereas the other three crops are set in the bottom of the furrow or on the side of the bed.

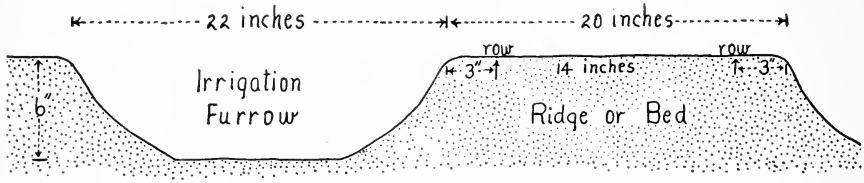


Fig. 2.—General type of bed and furrow used in the growing of different garden crops. Dimensions vary according to local conditions. Exp. Sta. Cir. 295.)

For honey dew and Persian melons, watermelons, casabas, cantaloupes, squash, cucumbers, etc., beds are made six to eight feet wide, with furrows between. For peppers, tomatoes and eggplant shallow furrows can be made three to eight feet apart with a hand or horse cultivator. The plants are set on the edge of the furrow, and water is run in the furrow immediately after setting.

SEEDING AND TRANSPLANTING

As a rule the smaller the seeds the shallower they should be sown. In heavy soils it is necessary to sow seed shallower than in light soils. The seed should be sown sufficiently deep to keep it in moist soil for germination and still allow the seedlings to reach the surface. The tendency is to sow seed too deep, rather than too shallow. The following crops are usually seeded directly in the field: beets, beans of all kinds, carrots, Chinese cabbage, cucumbers, chard, endive, kale, kohlrabi, lettuce, melons of all kinds, onions, okra, parsnips, parsley, peas, radishes, rutabagas, salsify, spinach, squash, and turnips. These crops can be sown with a small garden seeder, or the seed can be dropped by hand in shallow furrows and then covered with a hoe or rake. If the seed is dropped by hand the soil over the row should be firmed to facilitate germination. Many crops are started in greenhouses, hotbeds, coldframes, or special seed beds in the open field and

then transferred to the location in which they are to mature. Crops usually handled this way are onions (Bermuda, Italian Red, California Early Red), cabbage, cauliflower, broccoli, Brussels sprouts, celery, tomatoes, peppers, eggplant, and sweet potatoes. The dibber or trowel is often used to set plants having small root system, while large plants like tomatoes or eggplant can be set with a spade. The best time to set plants, especially during hot weather is toward evening. During most of the year plants should be watered immediately after setting, to settle the soil about them and facilitate the development of a new root system.

CULTIVATION

The main object of cultivation is to destroy weeds that use the soil nutrients and soil moisture needed by the garden crops. Heavy soils that bake easily and crack should be cultivated after heavy packing rains and also after each irrigation. For most crops shallow cultivation is best for it preserves the feeding roots in the surface soil. The weeds are most easily killed when they are very small; the larger they are the more difficult and the more costly it becomes to destroy them. In the farm garden cultivation should be done with horse implements if possible. In the small home garden the use of single-or double-wheel hand cultivators greatly facilitates tillage operations.

GROWING PLANTS FOR TRANSPLANTING

Growing Plants in Hotbeds.—A single hotbed covered by a standard glass sash, which is three feet by six feet, will be large enough for the ordinary home garden, and is used in California primarily to start eggplant, pepper, and tomato plants. The bed should be located where it will be protected from strong prevailing winds. There should be good natural drainage, an abundance of sunlight, and an available water supply. Figure 2 shows the cross section and top view of a hotbed, with dimensions and method of filing. The bottom of the pit is 22 inches below the ground line. The north side of the frame is six inches higher than the south side.

The hotbed is prepared as follows. Fresh horse manure is spread uniformly in a compact pile, and when heating starts, it is placed in the bed. That portion heating most violently is placed at the bottom of the bed and the remainder on top. Each three or four inches of manure should be well tramped, so that the entire mass will be uni-

formly packed. A bucket or two of water added to each bed will prevent burning during fermentation. About four inches of good garden loam soil, with clods and debris sieved out, is spread over the manure. The seed may be sown at once, but it is usually best to wait three or four days until the first violent heat is over and the weed seeds in the soil have had a chance to germinate. The best practice is to sow the

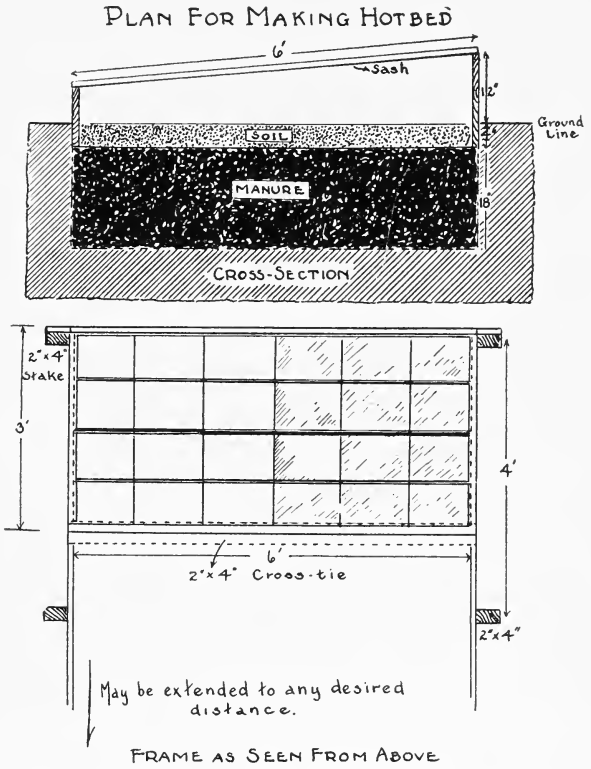


Fig. 3.—Above, cross section of hotbed showing method of construction and filling. Below, top view of coldframe or hotbed, with dimensions and method of construction. (Exp. Sta. Cir. 262.)

seed in rows spaced three to four inches apart. Seeds of cabbage, cauliflower, and others of similar size are sown in shallow furrows and then covered with about one-half inch of soil. Celery and other small seeds are barely covered; after seeding, the soil is slightly packed by tamping, then watered, covered, and left until the seedlings are just breaking through the soil. They are then given plenty of sunlight and good ventilation to promote the development of strong, stocky, plants. A too high temperature at this time is likely to produce a weak, leggy plant, subject to disease. As a rule watering

should be done only on bright mornings; it should be done thoroughly but only when needed. Ventilation is necessary on warm sunny days and is accomplished by raising the sash at one end or on the side away from the prevailing wind.

Hotbeds may be covered with any material that will hold the heat in the bed, prevent freezing, and protect the plants from beating rains. A medium-weight, unbleached muslin is cheap and satisfactory except in regions of extreme cold. The covers should be entirely removed a week or ten days before the plants are set in the field. Water should be withheld the last week or ten days before transplanting, and the plants should be allowed to wilt to some extent; this procedure helps to harden them and makes them better able to withstand transplanting.

Growing Plants in Coldframes.—The coldframe is similar to the hotbed except that no bottom heat is supplied, and the frame rests directly on the surface of the ground. It is customarily used to start plants like cabbage, cauliflower, and celery that are fairly cold-resistant. In most sections even during the winter the weather is so mild that these crops can be started successfully if the frames are located in a protected place and covered with glass or muslin. The seed will be a little slower to germinate in the coldframe than in the hotbed, and it will take a little longer for the plant to reach the transplanting stage.

As a rule tomato, eggplant, and pepper seedlings are removed from the hotbed when about one and one-half inches high, reset in cold frames, and spaced about three inches apart each way. These plants should not be set in the field until all danger of frost is over.

Plants can also be bought from commercial seedsmen and gardeners, but the person who masters the art of growing his own plants will generally be the most successful gardener. In the city, however, it is often impossible for the home gardener to grow his own plants.

ANIMAL PESTS OF THE HOME GARDEN

Several pests, other than insects, are likely to be encountered in the home truck garden. These are all readily controlled by the measures indicated below.

Brown Snail (*Helix aspersa*).—A common pest in gardens generally through the state, at the lower altitudes. Originally imported from Europe, now widespread and causing much damage locally.

The brown snail has a subglobular shell usually not over one inch in diameter, colored light brown, with several bands of dark brown

encircling the whorls. The soft body when extended is bluish gray. The gelatinous eggs about 1/8 inch in diameter are deposited in damp places under boards or boxes whence the young snails emerge after a few weeks.

The presence of snails and slugs is indicated by the glistening tracks of dried slime seen on the ground and on objects over which the animals have traveled. Damage by snails and slugs may be recognized by the sudden disappearance overnight of the tops of young plants, or of small new leaves, and, on older material by the presence of irregular scrapings or holes on the surfaces of leaves and stems. These animals feed chiefly at night and can often be seen at work if one visits the garden with a flashlight after dark.

As a temporary measure for immediate relief hand picking and destroying the gathered snails with hot water will help, although many of the smaller individuals which do greatest damage to young plants are likely to be missed as they are often hidden under leaves and in other out-of-the way places. The spreading of lime, ashes, sawdust, etc., about the bases of plants is of doubtful service. Snails are attracted readily to poisoned baits, and a mixture composed of 1 part of calcium arsenate (commercial grade) to 15 parts of wheat bran has proven very successful. The ingredients should be mixed dry, then lightly moistened. Then the bait is to be scattered about and under plants where damage is evident. Repeated applications of the baits at intervals of one to two weeks are desirable in order to make a thorough cleanup and to get the young which emerge from eggs after the adult population has been cleaned out. Calcium arsenate is poisonous to human beings and domestic animals and birds so care should be exercised in its handling and in the distribution of baits.

Slugs.—The slugs are close relatives of the snails but have the shell reduced and located internally so that the body is devoid of external protection. Three or more species of slugs are known to do damage to gardens in California. The enormous yellowish slugs (*Ariolimax*) of the northwestern humid portion of the state, from Monterey Bay northward, are occasionally reported as damaging gardens, but the chief offenders are three introduced species: the spotted slug (*Limax flavus*), a yellowish or brownish animal, up to 3½ inches in length, with bluish head, and long narrow tubercles on the body; the large gray slug (*Limax maximus*) of gray body color with longitudinal stripes and spots of black; and the "gray" garden slug (*Agriolimax agrestris*) a small species under 1½ inches in length and variously gray, yellow, brown, or black. The first two are present from the

vicinity of San Francisco Bay southward, the third is present throughout the coastal portion of the state and inland at least to Sacramento and Kern counties, and is by far the most important garden pest other than insects.

The slugs are active chiefly by night and seek shelter by day in crevices in the ground and under boxes, stones or other cover on the ground. They may sometimes be attracted to the arsenate-bran bait used for snails, but in the presence of green vegetation are less likely to seek the bait.

Control of slugs may be obtained by the use of a spray consisting of one-fourth to one-half pound of ordinary alum (either potassium or ammonium alum) per gallon of water. The alum should be dissolved in hot water, the solution cooled, and then sprayed *at night* when the slugs are out. It is necessary actually to spray the slugs with the solution and both ground and plants should be well sprayed so as to reach all the slugs. The treatment should be repeated at intervals of two or three weeks in order to kill adults missed at the first treatment and young which have emerged from eggs previously deposited.

Birds.—Several species of small birds including the white-crowned, golden-crowned and English sparrows, California linnet, and, at times, other native species, are known to attack garden truck, especially young plants. "Scare-crows" and strings festooned with strips of paper or white cloth, suspended over the rows of plants have been used to deter attacks, but with doubtful results. Spraying plants with nicotine sulfate or tobacco decoction has been used with some success, but where attacks are frequent or persistent screening with poultry wire of mesh not greater than ¾ inch is the only certain means of eliminating damage by birds. When the plants are older damage by birds is less frequent.

Pocket Gophers.—The gopher is an important enemy in gardens but fortunately can be controlled with a little diligence. Good results at all seasons of the year are had by trapping, and the Macabee trap is by far the best type now available. The gopher lives in tunnels of its own construction, 6 to 8 inches below and parallel to the surface of the ground. From these tunnels frequent laterals lead to the surface to throw out earth removed in excavation and to gather food. By opening new laterals (indicated by fresh, often damp, earth in the mounds), removing all loose earth, and setting one trap in the lateral; or a pair of traps, facing in opposite directions, in the main run, success will be had in one or more trials. The lateral can be cleaned out

with a large spoon, setting the trap just inside the lateral and covering the opening with grass or a clod to exclude most of the light. Some gardeners dig boldly down to the main run with a shovel and then set one trap in each of the two exposed ends of the main tunnel.

Moles.—In the coastal districts of central and northern California and at times elsewhere in the state, moles cause damage to gardens by burrowing along rows of plants or seeds in search of insects or worms; at times sprouting seeds are devoured. Several special types

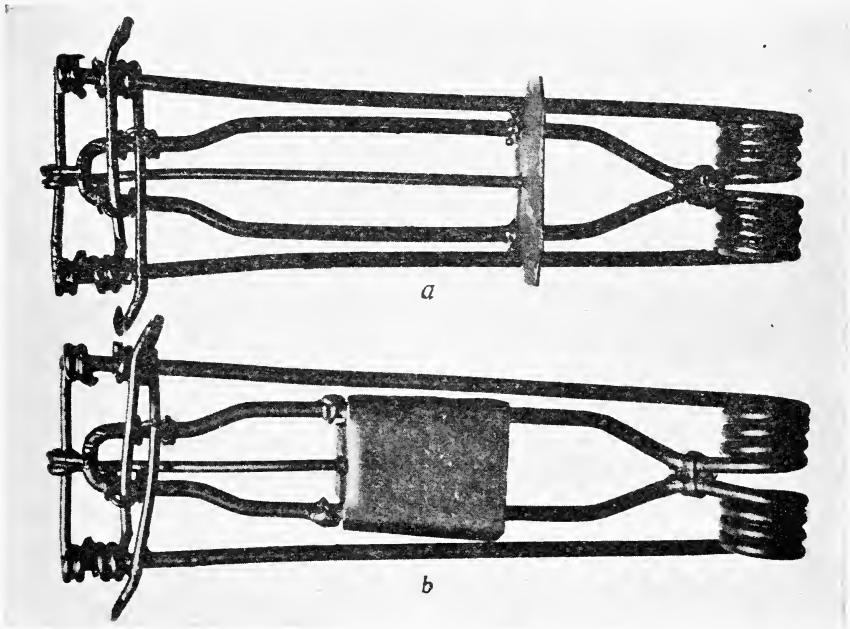


Fig. 4.—*a.* Regular Macabee gopher trap. *b.* Reconstructed Macabee trap used to catch "wise" gophers, and moles. (Exp. Sta. Bul. 340.)

of mole traps are available to be set on the top of surface runways. The Reddick and Out-o'-sight traps have proven satisfactory. Trapping results with moles are somewhat less satisfactory than with gophers as the traps depend for capture on the mole returning through a runway previously made, and this is not always certain.

In table 3, at the end of the circular, is given a list of the more common garden insects, the crops attacked and the type of injury done. Control methods are given in the section at the end of table 3. More complete information on the pests of the garden can be found in Circular 265, "Plant Disease and Pest Control," which is available from the Agricultural Experiment Station, Berkeley, California.

METHODS OF HANDLING THE DIFFERENT CROPS

Artichokes.—The globe artichoke thrives especially well in the coastal districts of California, where it can be made to produce the edible buds from August until May. In the interior sections it is generally possible to produce the buds for a short period in spring only. Under the influence of long, warm days, the bud scales soon get hard and spiny, and the flowers develop rapidly.

The plants have perennial roots, and when once established they may continue producing for 20 years or more. As the clumps of plants enlarge rapidly, seven or eight years' growth usually leads

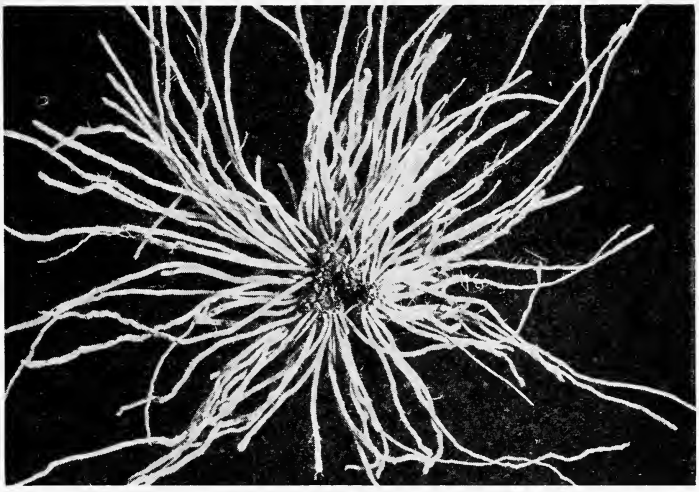


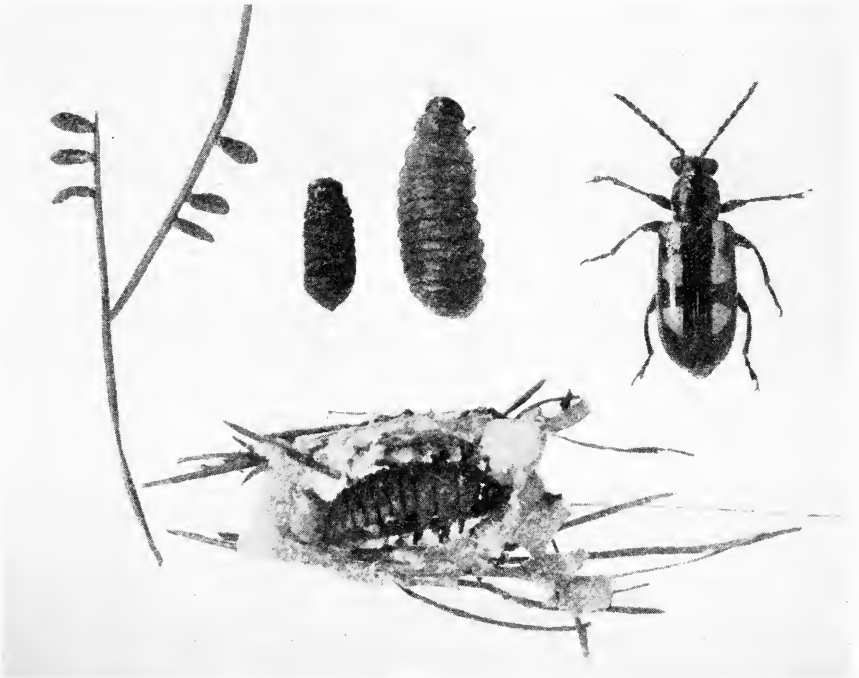
Fig. 5.—A well grown one-year-old Mary Washington asparagus crown, the kind that should be planted in the home garden.

to such crowding that the best production is no longer possible. Seedling artichokes are generally inferior, hence this crop is usually propagated vegetatively, by means of suckers taken from old plants of good type. The suckers should be taken up and transplanted in late fall. They will produce a few buds the following spring, and a much larger number the second season. The flower stalks are cut off near the ground every spring as soon as picking ceases. To let the flower stalks stand longer retards the development of next year's crop.

If fall and winter production is desired, the plants should be irrigated as soon as the old flower stalks are taken out. This causes several new suckers to start, and these should be made to grow

rapidly by means of good irrigation and cultivation through the summer. When only spring production is intended, as in the interior valleys, the plants remain dry and dormant all summer and start growth when the soil is moistened by winter rains.

The plants should be set at least 6 by 6 feet apart, for they become very large. They are sometimes used as a border along driveways or as a screen for fences and small out-buildings.



(Courtesy E. O. Essig)

Fig. 6. Stages in the life history of the common asparagus beetle. Left, eggs deposited on asparagus stem; center, larvae of different ages; bottom, pupa; right, adult beetle.

Asparagus.—This crop should have a place in every home garden. An established bed will produce food for the family daily for a period of 10 to 16 weeks. Large one-year-old crowns like those shown in figure 5 should be planted about eight inches deep some time during the winter or early spring. The fleshy roots are spread laterally in the trench, and then an inch of fine soil is placed over the crowns. After the young shoots appear, additional soil is moved into the trench; and by midsummer the entire trench can be filled. Edible spears should not be cut the same year the plants are

set, and not more than two or three spears should be cut per plant the second spring. The third spring, all of the spears should be cut for a period of three or four weeks; while during the following years, harvest may continue as late as the middle of June. A good growth of foliage should be obtained each year just after the cutting season. This foliage manufactures food which is transferred to the roots and stored there to be used by the next crop. In the late fall, when the tops have been killed by frost they are cut and burned. The soil over the crowns should be well cultivated before growth starts in the spring. The plants will produce good spears for 12 years or more, if given good care.

Beans.—Every garden should have at least two plantings of *snap beans,* for they are one of the easiest and most satisfactory crops to grow. They will, furthermore, do well in all parts of the state, if planted at the proper season, which is after the soil and air are warm—about the same time as for planting corn. One of the bush varieties should be planted for the early crop, and a pole or climbing variety for the late. Both kinds are planted at the same time, but the bush form will produce abundantly for two or three weeks before the pole form begins to bear. The latter will continue to produce until frost. In the southern part of the state a fall planting of the bush variety may be put in about September first.

Bush varieties are planted in rows about 2½ feet apart, or two rows can be planted on a 3-foot bed. The seed should be dropped about 4 inches apart and covered at least 1 inch deep with moist soil. Late plantings should be deeper. Pole varieties are generally planted in hills 3½ feet apart, with two or three plants to the hill. A stake five feet high is placed beside each hill, before the climbing stems appear. It is possible to grow the pole varieties without supports, but picking and irrigation can be done better when they are staked.

Both green-podded and wax-podded varieties of bush and pole snap beans are available. The green-podded are in general the most satisfactory, being more nearly stringless than the wax-podded. In sections where the rust is severe (the southern and central coastal districts) care should be taken to get the rust-resistant varieties. The resistant strain of Kentucky Wonder is perhaps the best of these.

Beans usually require frequent irrigation during the bearing season to keep the plants growing and at the same time producing, tender, stringless pods.

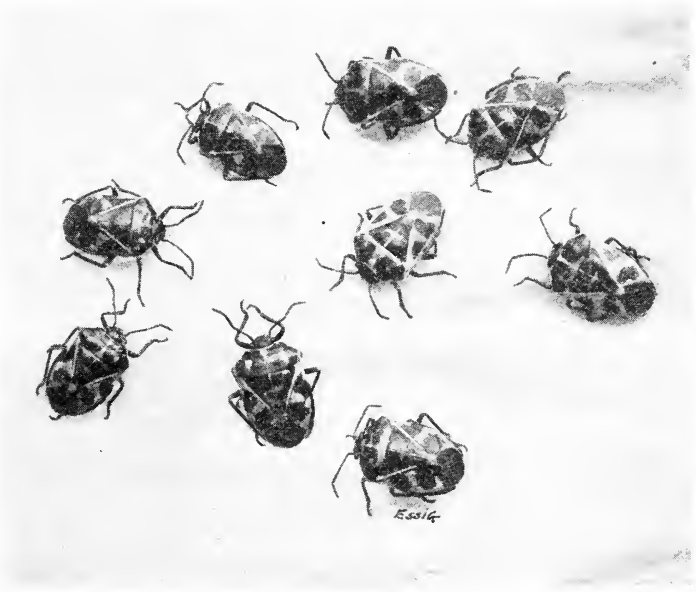
Although usually grown in California as a field crop for their dry seed, *lima beans* picked green are one of the most delicious of vegetables. They are seldom obtainable on the market, and then only at high prices. Limas are planted in rows 3 feet apart, with the plants 4 to 6 inches apart. It is not necessary to stake either bush or pole limas, under California conditions. For use as a fresh vegetable, the pods should be picked when they assume a slightly yellowish color.

The large-seeded limas do not do well in the interior valleys on account of failure to set pods and because of injury from the pod borer. Here the Hopi lima, resistant to both of these troubles, should be used. The Henderson Bush has also been giving very good satisfaction in the interior valleys.

Beets.—Beets will stand some frost; so the seed can be planted before danger of frost is over. In most sections of California the seed for the spring crop can be planted in January or Ferbruary. This will mature the crop early, as is desirable in those regions where "curly top" is prevalent because of leafhopper infestations. The seed for the fall crop can be sown in August; the beets will attain edible size by November or December. They can be left in the garden and pulled when wanted except in the higher altitudes, where the winters are more severe. It is best to sow the seed thickly in the row. The young plants make excellent greens when six to eight inches high; and if they are thinned at this time to stand 2 to 4 inches apart in the row, well-shaped roots will be obtained. Detroit Dark Red and Crosby's Egyptian are both excellent varieties. The latter variety matures a little quicker than the former.

Broccoli.—There are two kinds of broccoli—the sprouting and the heading. The *heading* or *cauliflower broccoli* is handled the same as cauliflower and has a head similar to it. It has a longer growing period than cauliflower, usually maturing the year following that of planting. The foliage growth is heavy and it is not necessary to tie the leaves over the head for blanching. The *sprouting broccoli* does not produce a solid head, but the edible part is the thickened flower branches which arise from the axils of the upper leaves and from the upper end of the stem. Broccoli plants should be grown to their maximum size during the fall before cold weather checks their growth. The plants remain nearly dormant for a time during the winter and develop the heads in early spring. St. Valentine is one of the best of the heading broccolis.

Brussels Sprouts.—This crop does not do well except along the coast. It is closely related to cabbage, is grown in about the same manner, but matures more slowly. Instead of a single terminal head, Brussels sprouts form a large number of small buds in the axils of the leaves, along the main stem. The sprouts are picked when hard and when their outer leaves begin to turn yellow. At harvest the sprout and the leaf at its base are both removed. The harvesting season is long: several pickings are made. Aphis is the most serious pest of this crop.



(Courtesy E. O. Essig)

Fig. 7.—Harlequin cabbage bug, adults. These bugs attack almost all mustard crops.

Cabbage.—In the interior valleys cabbage can be grown as a fall, winter, or spring crop; and along the coast it is possible to grow it throughout the year. Cabbage maturing during hot weather will need to be harvested as soon as hard. otherwise it will burst and rot. When this crop matures during cool weather, it will remain in prime condition for a long time. If the crop is to be used fresh, it is best to grow the small heading varieties like Copenhagen Market, Golden Acre, etc., For making sauerkraut, however, the larger heading, heavier yielding types such as Late Flat Dutch, Succession, and Danish Ballhead are more desirable. The Scott's Cross and the Savoys have been found to do very well in the southern part of the state on types of soil that are not especially fertile.

Cantaloupes.—Only in large gardens should this crop be attempted, on account of the space required; besides, it requires a long, warm season. Cantaloupes require a fertile soil, and it is often well to apply rotted stable manure under each hill before planting the seed. Hills should be spaced about 4 by 6 feet. About ten fruits per plant may be expected under favorable conditions.

Seed should not be planted until danger of frost is over—or if planted earlier, protection should be offered by paper covers. Boxes with the bottom removed and a pane of glass placed over the top can also be used. Ten or more seeds should be sown in each hill, and the plants thinned to two or three when the fourth leaf develops. It is best to prepare a bed 6 to 7 feet wide and plant the seed on the southern or western edge. The vines are trained on top of the bed, away from the irrigation furrow. Because both the spotted and the striped cucumber beetles are likely to be troublesome in the early part of the season the plants should be dusted often with hydrated lime and arsenate until the fruit is well started. Cantaloupes require frequent irrigation—mainly at the time the fruit is setting.

When it becomes ripe, cantaloupe fruit turns yellowish, and a crack forms around the base of the stem where it is attached to the fruit. After the fruit begins to ripen, the vines should be gone over every day or two, and the fruit picked just as the crack or "slip" forms. Such fruit will keep several days in a cool place, whereas fruit left in the field until it is fully yellow and the stem slips of its own accord, is likely to become strong flavored. For prolonged storage, cantaloupes should be placed in an icebox at about 40° F. Picking should always be done in the early morning.

Other Melons.—Besides cantaloupes, there are several other kinds of melons much grown in California, such as Honeyball, Honey Dew, Casaba, Santa Claus melon, and Persian melon. All of these are planted and handled in about the same way as cantaloupes.

The Honeyball variety is derived from a hybrid between Honey Dew and a cantaloupe. It is grown and used like cantaloupes, though it has some of the good qualities of the Honey Dew.

The Honey Dew matures about three weeks later than the cantaloupe. The large, unnetted white fruits assume a distinct yellowish tint; the rind softens somewhat at the blossom end when the fruit ripens, but the stem does not abscise.

Casabas and Santa Claus melons are even later than Honey Dew. In most parts of California, they do not attain edible maturity until the end of September, and if left upon the plant they continue to improve in flavor until the fruit is soft. They may also be picked in

the hard ripe stage and stored in a cool, dry place. They will keep six to eight weeks. The Persian is really a netted melon; it is of very high quality and handled like the Casaba.

Carrots.—The carrot is becoming very popular as a home garden crop, mainly because of its value in the diet. Carrots are often difficult to start during hot dry weather, and for this reason the soil should be well pulverized and a crust should not be allowed to form over the row before the seedlings are through. For best quality, they should be pulled while still young and tender. They will tolerate some frost, and in most sections of California the fall crop can be left in the soil until it is wanted for use. Probably the most popular variety is Chantenay.

Cauliflower.—To obtain the best quality, cauliflower must be brought to maturity when the weather is cool and fairly moist. This is usually during the late fall, winter, or early spring in most parts of California. It is necessary for cauliflower to make a steady growth; if stunted it may form small heads or buttons prematurely. Some varieties of cauliflower, such as Snowball, have a small amount of foliage which does not protect the head from the sun and weather, and it is therefore necessary to gather the outside leaves together and tie them over the head. To get a pure, white head, this must be done while the small inner leaves still protect the head. The head or curd is ready to harvest when it has reached a good size and is still compact.

Celeriac.—Celeriac is a form of celery in which the enlarged root is used for cooking. It is grown and handled the same as celery. Blanching, however, is not necessary.

Celery.—When celery plants are started in the coldframe or hotbed, the seed should be barely covered with soil. The seed is slow to germinate, and the plants are slow to develop. For its best growth celery requires a rich, moist soil well supplied with organic matter. Plants should be one-fourth to three-eights of an inch in diameter at the crown at time of transplanting. All cultivation should be shallow. Blanching can be done by use of soil, boards, or paper, or by storing in a dark cellar. Soil is used almost exclusively for blanching the crop that matures during the late fall or winter in the cooler portions of the state. As the crop approaches maturity a bank of soil is gradually raised against each side of the row. Care should be taken that the hearts of the plant do not become filled with soil. When the blanching is done with boards, those 1 inch thick, 10 to 16 feet long, and 12 inches wide are of a convenient size to use. These are laid on edge on both sides of the celery row and are

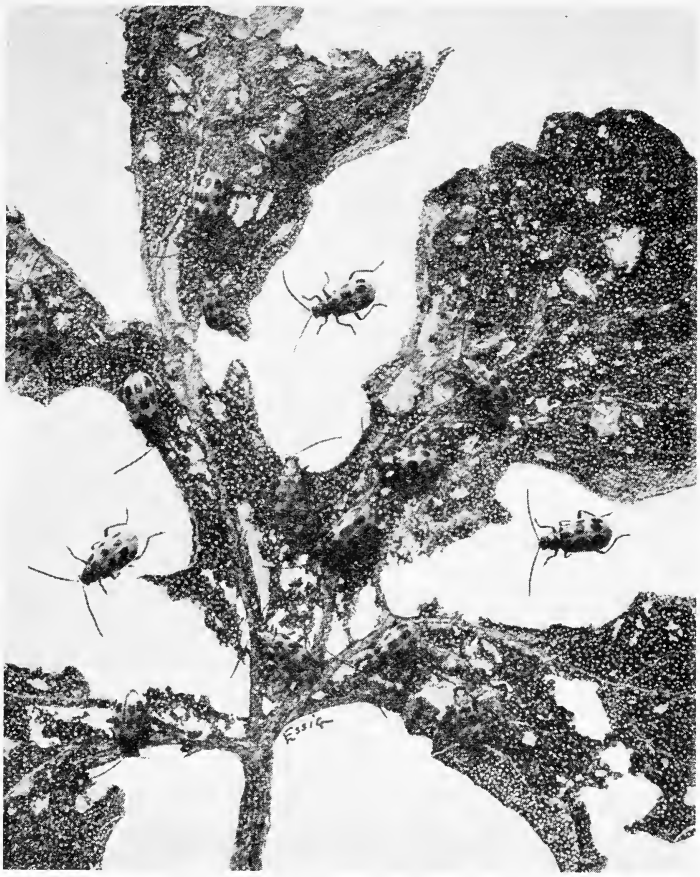
held together at the top by cleats or wire hooks. Blanching requires from 10 to 20 days. Heavy paper 12 inches wide may be used in the same manner as boards; it is held in place by a heavy wire arch placed every few feet. Newspapers are sometimes used, but they must be wrapped about each individual plant. Blanching with paper or boards is usually practiced with summer celery or with celery which matures in a very mild climate during fall, winter, or spring. In the warmer regions of the state, it is best to handle the crop so that it can be blanched during the cool part of the year. Along the coast, however, blanching can be done successfully during most of the year. A disease very prevalent in celery is late blight, most conspicuous in the leaf blade areas which finally die. In these diseased areas, small black fruiting bodies develop. For control it may be necessary to give several applications of 5–5–50 Bordeaux, at intervals of about two weeks. This spray material can be purchased from local seedsmen or druggists in dry form ready for mixing.

Chard.—Swiss chard is used mainly for greens. The crop should be started in winter or early spring in most sections of the state, in order to avoid severe damage from curly top which is caused by the beet leaf hopper. This crop is a heavy yielder and will produce greens throughout most of the year. As the plant develops, the older leaves are used and new ones develop from the center. A large number of pickings may be made from a single plant during a season.

Chicory.—Witloof chicory is grown chiefly as a salad. Seed is planted in the spring. The plants are thinned to stand about six inches apart. In the fall, the roots are dug and stored in a cool place where they will remain dormant. At intervals during the winter, roots are taken from storage and placed in moist soil under growing conditions. The crowns are sometimes covered with six to eight inches of clean sand; they are often covered with a foot or more of light straw, or with several inches of straw on top of which is placed several inches of warm manure. Under this covering, the leaves which are used for salad will be formed in a solid head.

Chinese Cabbage.—Chinese cabbage is grown as a salad crop and also for greens. It is difficult to get it to head if it is planted as a spring crop; much better success is usually obtained if the crop is matured in late fall. There are both heading and non-heading types; when the seed is bought care should be taken to obtain heading types. The seed is sown directly in the field, and later the plants are thinned to the desired distance. The heads are harvested when firm.

Cucumbers.—As cucumbers are easy to grow, and as only a few plants are needed to produce a supply for the average family, they may well be included even in small gardens. They are used for salad and for making pickles. If only slicing cucumbers are wanted,



(Courtesy E. O. Essig)

Fig. 8.—Twelve-spotted cucumber beetle. Easily identified because of twelve spots on the back. Attacks melons, squash, cucumbers, pumpkins, and many other garden crops.

Klondike or White Spine will be satisfactory varieties; but if both slicing and picking fruit are desired Chicago Pickle should be planted. The small fruits can be pickled and the larger ones used for slicing. The fruits should always be removed from the plant before they begin to turn yellow, or the plant will stop bearing. If picked and irrigated regularly, the plants should continue producing throughout the season.

Cucumbers are planted and handled like cantaloupes. They are not so sensitive to cool weather as cantaloupes, hence may be planted earlier and can also be grown in the cool coastal regions. They must, however, be grown where they will receive plenty of sunlight. It is better to have single plants about one foot apart in the row, than hills of several plants at wider spacings. Eight or ten plants will usually supply plenty of slicers for the average family.

Eggplant.—Eggplants are very popular with people from the southern states, but those from other sections are generally not well acquainted with them. The plants are grown and handled like tomatoes, but they are much more sensitive to cold and other adverse conditions, hence should be handled more carefully. If the plant is severely checked at any time, it does not recuperate very readily, and fruiting is seriously interfered with. Because of the difficulty in transplanting, it is well to sow the seed in small clay or paper pots, which are filled with fine, rich soil and placed in the hot-bed. The plants are thinned to one per pot, and when the weather becomes warm, the plants are removed and set in the garden. They should be spaced 3 by 4 feet apart, and should have plenty of manure and water. The young fruit is harvested when from four to six inches in diameter. A sharp knife is used to cut the tough fruit stem. The plants should bear from midsummer to frost.

The fruit should be peeled, sliced, and soaked in salt water for two hours to remove the bitter taste, before cooking.

Endive.—This crop is used much more extensively by Europeans than by Americans. It may be used for salad, as greens, or as a garnish. In the garden it is handled about the same as lettuce. It is best to mature it during the cool season of the year, preferably in late fall. It is somewhat slower growing than lettuce and therefore must be started earlier if grown as a fall crop. When the plant has reached a diameter of 12 to 15 inches the leaves should be gathered together and tied so that the heart will blanch. If the leaves are tied when wet, especially during warm weather, there is danger of decay. The plants should be harvested as soon as they are well blanched.

Garlic.—Garlic does very well in most parts of California if handled properly. It is used mainly for seasoning, and a few feet of row will supply sufficient garlic for the average family. It is propagated by small cloves obtained by dividing the mature bulb. The cloves are set in a fertile part of the garden sometime during the winter or early spring They are placed 2 or 3 inches apart and 1 to 1½ inches deep; cultivation is about the same as for the onion.

The bulbs are harvested when the tops begin to die. When only a few plants are grown, the tops can be braided together after harvest and the rope of garlic hung in a cool, dry place.

Kale.—Kale is a cool season crop and in some sections of the United States is grown to a considerable extent for greens. It is used mainly in the southern states and by the foreign population. Seed is usually sown directly in the field. At harvest time the entire plant may be cut off near the ground, or the lower leaves may be removed as they approach maturity. The plants remain edible for a considerable period, but if they are left in the garden too long, they become woody.

Leek.—Leek belongs to the onion group, but has only a mild onion flavor. It does not form a bulb, but is used the same as green onions. The plants should be thinned to stand 4 to 5 inches apart in the row. When the plants have reached almost full size, soil is drawn around them to a height of 6 to 8 inches to blanch the lower part of the plant.

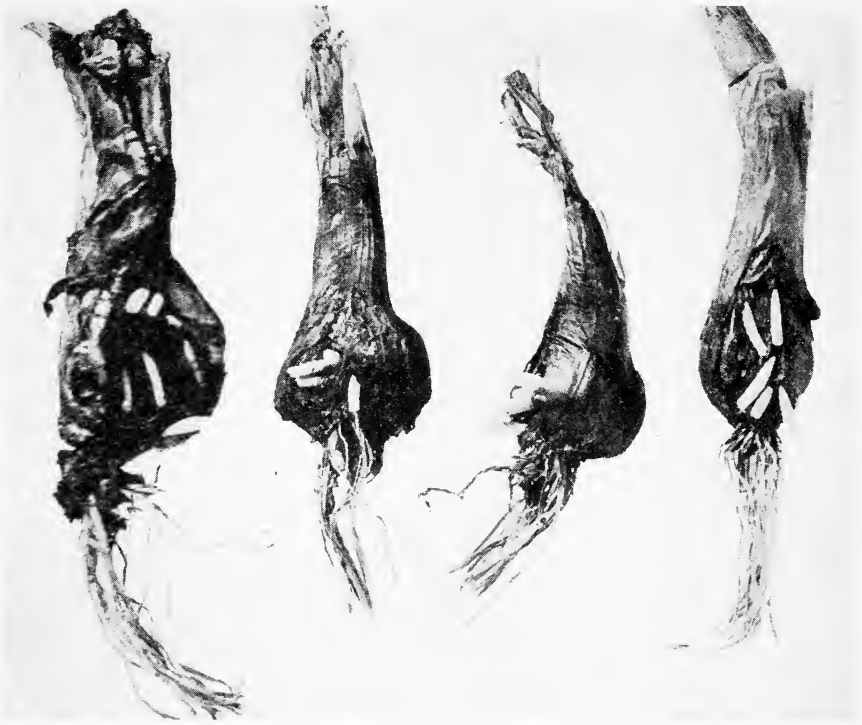
Lettuce.—Lettuce is our most popular salad crop and should be in every home garden during the time of the year when conditions are favorable. It is a cool season crop and cannot be matured during hot weather. Along the coast it can be grown most of the year. It is best to sow the seed where the crop is to mature. It should be sown rather thickly in the row; and the plants when about two inches high should be thinned to 12 inches apart. The best variety to use is New York; however, Black Seeded Simpson, a non-heading variety, will tolerate higher temperatures than New York and can be planted as a succession crop to follow New York in the spring of the year in the interior valleys.

Okra.—Though a common vegetable in the South, okra or gumbo is seldom seen in California. It is a splendid garden crop for the warmer sections, the young pods being used as a constituent of soup, especially tomato soup, or as a vegetable by themselves. The best way to prepare them is to fry the chopped pods in fat. Okra should never be cooked in iron pots or pans, on account of the discoloration which results.

The seed is planted in hills 2 feet apart, in rows 3 to 3½ feet wide, after the weather becomes warm. To get a good stand, the seed should be soaked in water for 24 hours, and then only the swelled seed should be planted. After pod formation begins, the young fruit should be picked every two or three days, for the plants

cease bearing if any pods ripen on the plant. In picking, care is necessary to avoid cutting off the tip of the stem, which prevents further production of pods.

Onions.—Italian Red and California Early Red are excellent varieties of onions for the home garden. They are sweet, produce large bulbs, but cannot be kept in storage for very long. The seed of this variety can be sown in a small seed bed in September and



(Courtesy H. H. Severin)

Fig. 9.—Onion maggots, burrowing and feeding in the basal portion of young onion plants.

then transplanted in December or January, in most localities. Seedlings can usually be purchased from seedsmen or plant growers. The Sweet Spanish is probably the best variety for the home gardener to grow for storage. It grows to a large size, has a mild flavor, and is a good keeper. Seed can be sown in late January or February. If sown earlier it is likely to form seed rather than bulbs. Onions should be given plenty of water until they have almost matured their bulbs. Their growth should not be severely checked at any time; otherwise doubles are formed which keep poorly in

storage. For green onions the white varieties such as White Portugal, are generally used because they are mild and have a clean appearance. Either seed or dry sets can be planted; if planted at the same time the sets will provide green onions several weeks before the seed.

Parsnip.—Parsnip seed may be sown during the winter or early spring. The best roots are obtained if the soil is not too heavy. The seed germinates very slowly and the crop is slow to mature. Radish seed is sometimes sown with that of parsnips to mark the rows and permit early cultivation. The roots gradually improve in edible quality during the winter, and storing them in a moist atmosphere just above freezing also improves their quality. They are not injured by freezing and may be dug when needed throughout the winter.

Peas.—The garden pea is not a difficult crop to grow; when raised in the home garden and prepared for the table immediately after harvest, it is of exceptionally good flavor. If held for even a short time after harvest the pods should be kept in the ice box or in the coolest place available. They should not be shelled until ready for use if high quality is to be retained. The pea is a cool season crop and in most sections of California is grown during the late fall, winter, and early spring. The young vines will tolerate a considerable amount of frost, but the flowers and young pods are very susceptible to frost injury. The Hundredfold, Laxtonian, Blue Bantam, and Laxton's Progress are excellent varieties to grow. In localities with a long cool growing season a much heavier yield and a longer harvesting season can be obtained from Alderman or other tall growing varieties. In California, inoculation of the seed is usually not necessary, for the desirable bacteria are native in most of our soils.

Peppers.—The varieties of peppers fall into two classes: the large-fruited, sweet type, used mainly in the green condition for salads and for cooking; and the small, hot-flavored varieties, which are used either green, ripe, or dried—for flavoring. A few plants of either or of both types may well be included in the home garden, for they are easy to grow, and require very little space.

Peppers are grown and handled like tomatoes, but the plants need be spaced only 15 by 30 inches apart. The plants are usually grown in hotbeds and transplanted to the garden after danger of frost is past. They may also be grown by sowing the seed directly in the garden, and thinning to one plant in a place. Cultural and climatic requirements are the same as for tomatoes, though a highly

fertile soil is more important for peppers. The green fruit is picked as needed during the summer, a sharp knife being used to sever the tough fruit-stem, thus avoiding breakage of the rather fragile plants. Hot peppers intended for drying or for making sauces are usually allowed to ripen on the plant, the fruit turning red at this stage. Peppers can be dried for winter use by picking with at least one inch of stem, and stringing them with a needle and thread. The strings are hung in a sunny place until the fruit is dry and brittle.

Potatoes.—Small gardens should include only a small amount of an early variety of this vegetable, as good potatoes can usually be bought cheaply in city markets throughout the year. Where there is plenty of land of suitable type for potatoes, especially on ranches at a distance from market, enough potatoes for the entire season can be grown. In the warmer sections this is best done by growing two crops a year—a spring crop for summer and fall use, and a fall crop for winter and spring use.

It is important to get good seed potatoes. In most sections it is best to get new seed each year, especially in warm climates. There is usually rapid degeneration in potatoes unless rigid selection is made to keep up the quality. State-certified seed should be procured when available; otherwise seed can be purchased from a grower in a section known to produce good seed. The seed pieces should be from one to two ounces in weight, with one or more eyes. The potatoes should not be cut more than a day or two before planting. Treatment with sulfur, lime, or ashes to dry the cut pieces is useless. Small potatoes planted whole are satisfactory when they are derived from healthy plants. The old superstition about the effect of the moon upon time of planting is not based upon fact. The planting date should be about one month before danger of the last frost in spring, about August 1 for the fall crop, and about June 1 for the main crop in cool sections.

The seed pieces are dropped in furrows 30 to 36 inches apart, and from 12 to 15 inches distant in the row. They are covered 6 inches deep by forming a ridge over the seed, but the top of this ridge is raked or harrowed off about the time the sprouts reach the surface. No irrigation is needed, as a rule, until the plants are six to eight inches high. Where surface irrigation is practiced, a deep furrow is made between the rows, and a small stream of water turned in and allowed to run until the moisture has penetrated through the bed on which the plants are standing. The water should be handled so that the soil around the stems of the plants, and where the tubers are

forming, is never flooded. Flooding results in misshapen tubers. The aim should be to give light irrigations often enough to keep the soil around the roots moist all of the time. Potatoes are shallow-rooted.

Early potatoes are harvested as soon as tubers large enough for table use are formed. Potatoes that are to be stored for some time are not dug until the plants are partly dead, and the skin on the tubers has become firm enough so that they do not become "feathered"

(Courtesy E. O. Essig)

Fig. 10.—Wireworms feeding and burrowing in potato tuber. Wireworms usually leave the tubers after they are dug.

upon handling. After digging, the potatoes should be removed promptly to a cool, dark cellar, to avoid injury from the hot sun and to prevent infection by the tuber moth.

Radishes.—The radish is one of the easiest crops to grow, and should have a place in every home garden. It can be grown throughout a large part of the year along the coast, but in the interior valleys it does best as a fall, winter, and early spring crop. It will tolerate considerable frost but in hot weather becomes bitter. Probably the best home garden variety is the Icicle; it is very mild and a good yielder. A succession of plantings should be made every two or three weeks in order to have an available supply in the garden. It is well to plant radishes in small amounts and often, in order to insure a continuous supply; a few feet of row is usually sufficient, especially of the early maturing varieties, which quickly become inedible. The

most serious pest is the radish or cabbage maggot. About the only way to keep this insect under control in infested regions is to grow the crop in a coldframe covered with coarse cheese cloth to prevent the flies from laying their eggs about the plants. Black root is destructive, especially in home gardens where it is difficult to practice a rotation. The White Chinese variety has been shown to be somewhat resistant to this disease.

Rhubarb.—Rhubarb or 'pieplant' is a perennial vegetable, which is very easily grown everywhere even in small gardens. The edible part is the leaf-stalk or petiole; it is used chiefly in the spring, but may be had throughout the summer if the plants are kept growing by irrigation.

The plants are started by planting pieces of an old 'crown' or rootstock, which has at least one good strong bud, during winter or very early spring. Few, if any, leaves are picked during the first season, but the plants should be encouraged to grow vigorously until early summer. The plants are usually allowed to dry up in summer, and remain dormant until growth is started by the winter rains. When the buds begin to swell, a ridge of loose soil may be formed over the plants. The leaves, forced to grow through this, develop much longer stalks. The leaves are harvested for a period of two or three months in spring.

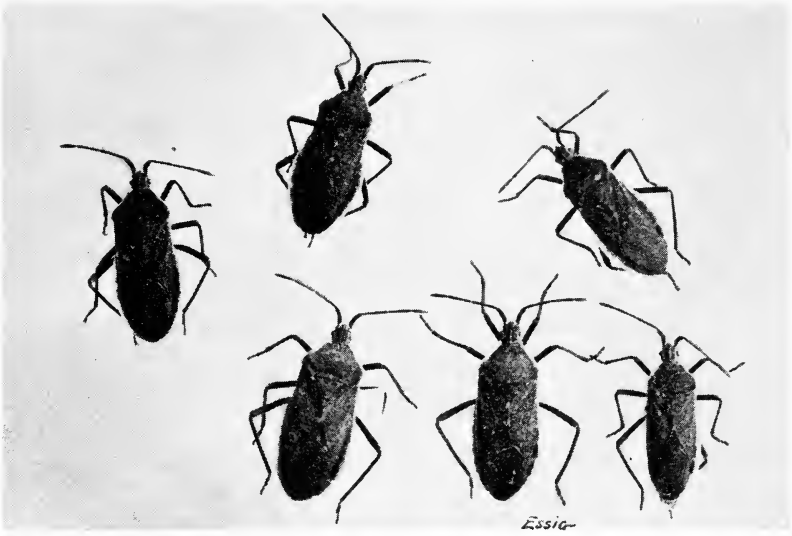
Salsify.—Salsify is one root crop that is deserving of more extensive cultivation. Its uses are similar to those of the parsnip; and when prepared for the table, it has a decided oyster flavor. The crop is slow growing and takes a long time to mature; it should therefore be started in early spring. Its cultural details are similar to those of the parsnip. The roots being hardy, can be left in the soil and dug when needed during the winter.

Spinach.—Spinach is an easy crop to grow; because of its dietetic value it should have a very prominent place in every home garden. It is a cool-season crop and can be easily made available from October to May, in most parts of California. To do this, however, requires that several different plantings be made. For the fall crop, plant about September 1; for winter, October 1; and for spring, in November to January. The plants will stand 10 degrees below freezing when small, though larger plants may be injured by this temperature.

The seed for fall crop has to be planted on beds, because irrigation is necessary. But for winter and spring crops, planting on level

ground is satisfactory, as the winter rains will provide moisture for growth, in most sections. The rows should be about 15 inches apart for Prickly or Viroflay varieties, but only 10 inches for Savoy. The young plants should be thinned to one inch apart in the row, and later thinned by cutting the large plants for use first. At harvest time either the whole plant or only the large leaves may be cut. The latter practice allows a second crop of leaves to be produced.

Squash and Pumpkins.—The numerous varieties of squash fall, from the gardener's point of view, into two main groups—summer



(Courtesy E. O. Essig)

Fig. 11.—Squash bugs, adults. A serious pest on cucumbers, squash, pumpkins and melons.

squash and winter squash. The former are grown as a fresh vegetable for use during summer, in the immature condition; the latter are used during fall and winter, in mature condition, for baking, for making pies, and for stock feed.

Of the summer squash, there are three common varieties in California: the Scallop or White Bush, the Italian or Cocozelle, and the Warted Summer Crookneck. Though differing much in appearance, they are very similar in flavor when cooked. These three varieties all have 'bush' or short-stemed plants. They require, therefore, rather little space, especially as four or five plants will produce a supply for the average family throughout the season. The seed is planted in early spring in hills three by five feet; the plants are

thinned to one in a place, and subsequently handled like cantaloupes. The young fruit is gathered before the rind hardens. It is of the best quality about a week after blossoming.

Winter squash are planted in late spring or early summer. The hills should be spaced 6 by 10 feet apart, and handled like watermelons. As the plants are very vigorous growers, the winter squash is usually planted on poor or waste land that could not well be used for other crops. The fruits should be left on the plant until fully mature, and usually they are not picked until frost has nipped the leaves. They are best stored in a cool dry room. A short piece of stem is left on the fruits when picked. Popular kinds of winter squash are Hubbard, Boston Marrow, Banana, and Table Queen. The foregoing are true squash, though sometimes called pumpkin. The winter squash are much better for all the purposes for which pumpkins are traditionally used. Varieties of pumpkin are California Field and Mammoth. They are very productive, but are of coarse texture. They are also used for stock feed and Jack-O'Lanterns.

Sweet Corn.—Sweet corn seed can be planted as soon as the ground is warm in the spring of the year. This is one of the most delicious vegetables produced in the home garden. Sweet corn harvested in the milk stage and then prepared for the table immediately, is of much higher quality than corn that is a day or two old before it reaches the consumer. Sweet corn loses sugar very rapidly after harvest if held at high temperature. If it must be held for only a few hours, it should be kept in the ice box or in the coolest place available. A succession can be obtained by planting a good variety at intervals of ten days or two weeks, or by planting early (Golden Bantam, Early Alameda) and late varieties (Oregon Evergreen, Stowell's Evergreen) at the same time. It is better to plant sweet corn in small blocks rather than in single rows, so that pollination may be facilitated and the ears fill better. In most California districts it is necessary to keep the suckers removed from the base of the main stalk in order to obtain a fair sized ear.

Sweet Potatoes.—The culture of sweet potatoes is limited to the warmer parts of California. Light, sandy soils are also essential for this crop. The plants are very sensitive to cold, and the edible fleshy roots do not develop well in heavy soils.

Sweet potatoes are generally grown from 'sprouts'. These are obtained by placing small roots in a hotbed about March 1, and

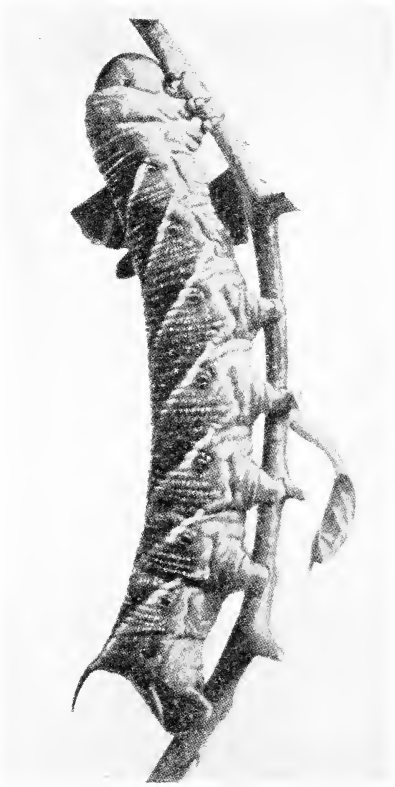
covering with 3 or 4 inches of sand or loam. Sprouts about eight inches long—large enough for transplanting to the garden—should be ready in six weeks. Several crops of sprouts will be produced during the following two months, if the hotbed is kept moist. The sprouts are pulled as needed and transplanted to garden beds 3 feet from center to center, and at least one foot high at the ridge. Varieties like Nancy Hall, which tend to produce only a few large potatoes on each plant, should have the plants set close—from 6 to 10 inches apart. Varieties of the Jersey type, which generally produce a large number of small roots, should have wider spacing—12 to 15 inches apart in the row. The vines should cover the entire surface of the soil by midseason. Frequent light irrigations are required on the sandy soils in which sweet potatoes thrive best.

Harvesting can begin by mid-August, when roots large enough to use are available. Sweet potatoes dug immature are not, however, of especially good quality. It is best to leave them in the ground until the roots are full grown, and the vines begin to turn yellow. Often the leaves will be killed by frost before this condition is reached. Then the vines should be cut away and the potatoes dug and stored at once. In harvesting, care should be taken to avoid cutting or bruising the roots, which is likely to lead to decay. Sweet potatoes are easily kept for six or seven months if proper conditions are provided. As soon as they are dug, the roots should be placed in boxes in a warm dry cellar, or in a room where they will not be exposed to chilling or to moisture. A portion of the starch in sweet potatoes changes to sugar during storage, and the best edible condition is not attained until they have been in storage for several weeks.

The vines and leaves of sweet potatoes are an excellent green food for stock, but pruning the vines excessively for this purpose during the growing season will lower the yield.

Tomatoes.—The tomato is probably the most widely grown and most generally satisfactory of home garden crops. It thrives in practically all parts of California. A few plants of at least two varieties should be grown—one of the extra-early sorts, such as Earliana, for table use during the summer, and a larger number of plants of a late variety, as Stone, Santa Clara Canner, or Ponderosa, for use during the fall, and for canning. Besides being used as a salad and as a cooked vegetable in the fresh conditions, tomatoes are easily canned, and are used for making catsup, chili sauce, green pickles, and other products. Tomatoes are so universally liked as a vegetable that it is hardly necessary to emphasize their importance from the health standpoint.

Tomatoes are usually started by sowing the seed in a hotbed about February 1. When the seedlings have their first rough leaf, they are transplanted or thinned in the hotbed so that they stand about three inches apart. Care is needed to avoid over-watering; and by free ventilation of the bed on warm days, a stocky hardy type of plant is formed. They should be transplanted to the garden



(Courtesy J. W. Folsom)

Fig. 12.—Tomato hornworm.

when about 10 inches high. If the plants become too tall in the hotbed, the apical bud may be pinched out. They are sensitive to frost, and if there is danger of freezing after they are transplanted to the garden, they may be protected by covering on cool nights with empty boxes or tubs. It is well to have a few extra early plants and protect them in this way, while the main planting of a later variety is deferred until danger of frost is over.

For ordinary culture, early varieties should be set about 3 by 5 feet apart, and late varieties about 6 by 6 feet apart. Early varieties are sometimes set about one foot apart in rows and trained to a

single stem. A stake is placed by each plant and the stem tied to it at intervals, as it grows upward. The side shoots are pinched off as they appear. Staking and pruning is very economical of space and results in much cleaner fruit than the unstaked plants produce.

Most gardeners tend to over-water tomatoes. While they are successfully grown without irrigation on deep fertile soils in the cooler

(Courtesy H. H. Severin)

Fig. 13.—Cabbage root maggot burrowing and feeding in turnips. The root maggot attacks almost all of the mustard crops.

parts of the state, they do better, as a rule, if irrigated three or four times. An irrigation at time of planting should usually be sufficient until after the early fruit is set, especially if the soil is heavy.

The most destructive disease of tomato in many sections is the so-called blight disease or 'yellows'. The most practical way for the gardener to combat this trouble is to sow the seed directly in the garden, about March 1, and thin the seedlings to three or four in a place. It is unlikely that all of them will be killed by the disease. Another trouble, wilt, occurs in the coastal regions, where yellows is usually not destructive. Wilt is prevented by use of a resistant variety, of which Marglobe (early) and Norton (late) are most satisfactory.

Fruit intended for late fall and early winter use may be picked in the green-mature or 'pink' stage, before the vines are killed by frost, and stored in a cool, dry room. Small fruited varieties, as Red Pear and King Humbert, keep much longer than the large-fruited types.

Turnips.—The turnip may be grown either as a spring or as a fall crop, but if it is to be of the best quality, its growth must be continuous, and it should mature while the weather is cool. For best quality it should not be allowed to become too large.

Watermelons.—Although watermelons are universally popular, the large amount of space required allows them to be grown only in the larger gardens. The general methods of planting and handling are the same as for cantaloupes, but the hills should be at least 6 by 10 feet apart.

Watermelons are successfully grown without irrigation in many sections where the soil is deep and the winter rainfall exceeds 12 inches. In fact, many growers believe that dry-farmed watermelons are much better in quality than those grown with irrigation. Excellent fruit can, however, be produced when a moderate amount of irrigation is practised. When dry-farmed, the seed should be planted as early as possible in spring, and the plants thinned to a single plant in a hill.

Watermelons will not cross with cantaloupes, squash, or other vine crops; but they do cross readily with the stock melons or citrons, which are a common weed in many places. The result of such crossing does not effect the quality of the fruit, but gives hybrid seed, which if planted the following year, produces inedible melons. Hence seed should not be saved where there is danger of crossing with citrons.

The best test for ripeness in watermelons is to rap the side of the fruit with the knuckles: a light or hollow sound indicates that the fruit is still green, while a dull sound indicates ripeness. This test is most reliable in early morning, but during the heat of the day, or after melons have been picked for some time, they all sound ripe, regardless of stage of maturity.

ACKNOWLEDGMENTS

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PLANTING CALENDAR
AND
TABLE OF INSECT PESTS
WITH MEANS OF CONTROL

TABLE 1

VARIETIES RECOMMENDED AND PLANTING DIRECTIONS FOR CALIFORNIA VEGETABLES

Crop	Variety	Seed for 100 feet of row	Distance between plants	Distance between rows
Artichokes	Green Globe	20 plants	5 ft.	6 ft.
Asparagus	Mary Washington	67 crowns	1½ ft.	7½ ft.
Beans, snap, (bush)	Stringless Refugee, Pencilled Pod, Black Wax	½ lb.	4 in.	2½ ft.
Beans, snap, (pole)	White Creaseback, Kentucky Wonder	¼ lb.	2 ft.	3½ ft.
Beans, lima, (bush)	Burpee's Bush, Henderson's Bush	½ lb.	6 in.	3 ft.
Beans, lima, (pole)	Sievi, Hopi, Lewis	½ lb.	10 in.	3½ ft.
Beets	Detroit Dark Red, Crosby's Egyptian	2 oz.	2–4 in.	16 in.
Broccoli	St. Valentine	34 plants	3 ft.	3 ft.
Brussels Sprouts	Improved Half Dwarf	50 plants	2 ft.	3 ft.
Cabbage	Golden Acre, Copenhagen Market, Scott's Cross	67 plants	1½ ft.	3 ft.
Cabbage, (late)	Flat Dutch, Savoy	40 plants	2½ ft.	3 ft.
Cantaloupes	Hale's Best, Paul Rose, Tip Top	½ oz.	4 ft.	6–7 ft.
Carrots	Chantenay, Danvers Half Long	1 oz.	2 in.	12 in.
Cauliflower	Snowball, Pearl	50 plants	2 ft.	3 ft.
Celery	Golden Self-blanching, Golden Plume	200 plants	6 in.	3½–4 ft.
Chard	Lucullus	2 oz.	12 in.	2–3 ft.
Chinese cabbage	Wong Bok (Paoting)	1 oz.	15–18 in.	2½–3 ft.
Corn (sweet), early	Early Alameda, Golden Bantam, Carmel Golden	¼ lb.	15 in.	3 ft.
Corn (sweet), late	Oregon Evergreen	¼ lb.	18 in.	3 ft.
Cucumbers	Klondyke, Lemon, Chicago Pickling, Japanese climbing (trellising)	½ oz.	3 ft.	5 ft.
Eggplant	New York Improved, Black Beauty	34 plants	3 ft.	4 ft.
Endive	Green Curled, Broad Leaved Batavian	½ oz.	12 in.	2 ft.
Kale (for greens)	Dwarf Scotch Curled	¼ oz.	12 in.	2 ft.
Kohlrabi	White Vienna	¼ oz.	6 in.	2 ft.
Leek	American Flag	½ oz.	6 in.	2 ft.
Lettuce	New York (Los Angeles Market)	½ oz.	12 in.	16–20 in.
Melons (watermelon)	Klondike, Angeleno	½ oz.	6 ft.	8–10 ft.
Melons, Casaba	Golden Beauty	½ oz.	4 ft.	6 ft.
Melons, miscellaneous	Honey Dew, Honeyball, Persian, Jap melon	½ oz.	4 ft.	6 ft.
Okra	Mammoth Green Pod	1 oz.	2 ft.	3 ft.
Onions, early	California Early Red, Italian Red	1 oz.	3 in.	12–18 in.
Onions, late	Sweet Spanish, Yellow Globe Danvers	1 oz.	3 in.	12–18 in.
Parsley	Double Curled	¼ oz.	8 in.	2 ft.
Parsnips	Hollow Crown	¼ oz.	6 in.	2 ft.
Peas	Hundredfold, Laxton's Progress	¾ lb.	2 in.	3 ft.
Peppers (sweet)	Ruby King, Bull Nose	50 plants	2 ft.	3 ft.
Peppers (hot)	Mexican Chili	50 plants	2 ft.	3 ft.
Peppers (very hot)	Anaheim Chili, Red Chili, Tobasco	50 plants	2 ft.	3 ft.
Peppers (pimiento)	Perfection	50 plants	2 ft.	3 ft.
Potatoes (early)	White Rose, Red Rose, Bliss Triumph, Irish Cobbler	10 lb.	12 in.	2½–3 ft.
Potatoes (late)	Burbank, British Queen	10 lb.	15 in.	2½–3 ft.
Pumpkins	California Field, Italian Cheese	1 oz.	6 ft.	10 ft.
Radishes	Icicle, Scarlet Turnip White Tipped	1 oz.	1–2 in.	12 in.
Rhubarb	Strawberry, Giant Cherry	34 plants	3 ft.	4 ft.
Salsify	Mammoth Sandwich Island	2 oz.	2 in.	12–18 in.
Spinach	Savoy, Viroflay, Prickly Winter	1 oz.	2–3 in.	12 in.
Squash (summer)	Early White Bush, Cocozelle	½ oz.	4 ft.	4 ft.
Squash (winter)	Boston Marrow, Hubbard, Banana	1 oz.	6 ft.	8 ft.
Sweet Potatoes	Nancy Hall, Yellow Jersey, Porto Rico	80 plants	12 in.	3 ft.
Tomatoes (early)	Bonny Best, Earliana	25 plants	4 ft.	6 ft.
Tomatoes (late)	Stone, Santa Clara Canner	16 plants	6 ft.	8 ft.
Turnips	Purple Top White Globe	¼ oz.	4 in.	16 in.

TABLE 2

Planting Dates for Sections in California

Crops	North coast	South coast	Interior valleys (except Imperial and Coachella)
Artichokes (suckers)	August–December	October–December	January–February
Asparagus (crowns)	January–March	January–February	January–February
Beans, snap and pole	May–June	March–August	April–May
Beans, lima	May–June	April–May	May–June
Beets	All year	All year	August, February
Broccoli	June–July	June–July	July
Brussels sprouts	June	———	———
Cabbage	Jan.–April, July–Sept.	October–February	July, Jan.–Feb.
Cantaloupes	May 1	April–June	April 20
Carrots	All year	All year	July–August, Feb.
Cauliflower	June, January	May–July	July–August
Celery	March–June	March–August	February–March
Chard	February–March	November–February	February
Chinese cabbage	July–August	August–September	August
Corn (sweet)	April–July	March–August	March–July
Cucumbers	April–June	March–June	April–June
Eggplant (plants)	May	April	April
Endive	June–July	July–August	July
Kale	Jan.–April, July–Sept.	September–March	Aug.–Sept., Jan.–Feb.
Kohlrabi	Jan.–April, July–Sept.	September–March	August–Sept., Feb.
Leek	January–March	January–February	January–February
Lettuce	November, August	July, December	August, Nov.–Dec.
Melons	May 1	April–June	April 20
Okra	May 15	April	May 1
Onions	January–March	November–February	November–February
Parsley	All year	August, April	February–March
Parsnips	March, May	August, March	February–March
Peas	All year	Sept., Dec.–March	November–January
Peppers (plants)	May 1	April–July	May
Potatoes (early)	February 15	January 15–February	February–March
Potatoes (late)	April–May	March 1, August 1	March 1, August 1
Pumpkins	May 1	April 1	April 20
Radishes	All year	All year	Sept., Feb.–March
Rhubarb (plants)	December–January	December–January	January–February
Salsify	March–April	September–March	January–March
Spinach	August–February	September, January	September, January
Squash (summer and winter)	May 1	April–June	April 15
Sweet potatoes (plants)	May	April	May
Tomatoes (plants)	May 1	April–August 15	April–May
Turnips	August, April	All year	August, February

TABLE 3—COMMON GARDEN INSECTS OF CALIFORNIA

Crop	Insect	Stage which does damage	Type of injury	Control method (See section "Methods of Control" at foot of table)
Artichokes	Plume moth	Larva	Eat holes in the buds	1, 10
Asparagus	Asparagus beetle	Adult, larva	Feed upon spears and mature stalks	1, 2
Beans	Cucumber beetle	Adult	Eat leaves and pods	14
Beets	Beet leafhopper	Adult, nymph	Dwarfed growth, curling of the leaves	3
Cabbage, Cauliflower, and Kohlrabi	Cabbage maggot	Larva	Tunnel in base of stem and roots	5
	Cabbage worm	Larva	Eat foliage	1, 2
	Harlequin bug	Adult, nymph	Suck juice from foliage	4
	Cabbage aphis	All stages	Suck juice from foliage	6
	Cut worms	Larva	Cut off young plants	8
Cucumbers	Cucumber beetle	Adult	Eat leaves and stems	11
	Squash bug	Adult, nymph	Suck juice from stem	6
	Aphis	Adult	Suck juice from stem and leaves	6
Eggplant	Flea beetle	Adult	Eat leaves of young plants	12
Lettuce	Cut worm	Larva	Cut off young plants	8
	Grasshopper	Adult, nymph	Eat leaves of young plants	8
Melon	(Same as cucumber.)			
Onions	Maggot	Larva	Burrow in the bulb	No satisfactory method
	Thrips	Adult, nymph	Suck juice from foliage	7
Potatoes	Wireworm	Larva	Destroy seed pieces, deform tubers	13
Peas	Aphis	Adult, nymph	Suck juice from the plant	6, 7
Squash	(Same as for cucumber.)			
Tomatoes	Horned tobacco worm	Larva	Eat leaves and fruit	1 or 2
	Fruit worm	Larva	Bore holes in fruit	1 or 2
Sweet corn	Corn earworm	Larva	Eat corn kernels	9

Methods of Control:

(1) Dust mature plants with a mixture of air slaked lime (5 parts) and powdered lead arsenate (1 part).
(2) Spray with a solution made of 2 ounces of powdered lead arsenate, 2 ounces of laundry soap, and 3 gallons of water.
(3) Plant early, so that the plants will be well established before insects appear.
(4) Hand pick.
(5) Protect plant with tarred paper disk placed at base of plant at time of transplanting.
(6) Dust with a mixture containing about 5 per cent nicotine sulfate.
(7) Spray with a solution containing 2 tablespoons of nicotine sulfate, 1 ounce soap in solution, and 3 gallons of water, about every 10 days after insects appear.
(8) Thoroughly mix 1 pound of bran with 2/3 ounce of white arsenic. Dilute 1/6 pint molasses with a small amount of water and then mix with the bran into a crumbly mass. For cut worms, scatter along the rows of plants at night; add one-half ground orange to above for grasshoppers and scatter in early morning.
(9) Dust silks with a mixture of powdered lead arsenate and finely ground sulfur. Give first application when silks are two inches long, and repeat every three or four days till silks are dry.
(10) Burn buds as soon as picked and flower-stalks when picking is finished.
(11) Dust with hydrated lime (10 parts) and basic arsenate of lead (1 part).
(12) Spray with Bordeaux mixture, 4-4-50 formula. This mixture can be purchased in small amounts in the dry form from local druggists or seedsmen.
(13) Avoid infested soil, or use an early trap crop and destroy worms with cyanide.
(14) Dust with hydrated lime or finely ground sodium fluosilicate.

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